

60V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	Rds(on)	I _D T _A = +25°C
-60V	150mΩ @ V _{GS} = -10V	-3A
	185mΩ @ V _{GS} = -4.5V	-2.7A

Description and Applications

This MOSFET has been designed to minimize the on-state resistance yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Motor Control
- Transformer Driving Switch
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low On-Resistance
- Fast Switching Speed
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please <u>contact us</u> or your local Diodes representative. https://www.diodes.com/quality/product-definitions/
- An Automotive-Compliant Part is Available Under Separate Datasheet (<u>DMP6185SEQ</u>)

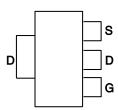
Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound.
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.112 grams (Approximate)

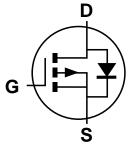




Top View



Pin Out - Top View



Equivalent Circuit

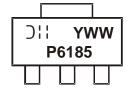
Ordering Information (Note 4)

Part Number	Case	Packaging
DMP6185SE-13	SOT223	2,500 / Tape & Reel

Notes:

- 1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
- 2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- 4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



☐ Sill = Manufacturer's Marking
☐ P6185 = Marking Code
☐ YWW = Date Code Marking
☐ Y or Y = Year (ex: 0 = 2020)
☐ WW = Week (01 to 53)



Maximum Ratings (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit		
Drain-Source Voltage	VDSS	-60	V		
Gate-Source Voltage		V_{GS}	±20	V	
Continuous Dunin Comment (Note C) 1/ 401/	T _A = +25°C	I-	-3	^	
Continuous Drain Current (Note 6) VGS = -10V	T _A = +70°C		-2.4	A	
Maximum Body Diode Continuous Current		Is	-2	Α	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	-15	Α		
Single Pulsed Avalanche Current (Note 7)	las	-16	Α		
Single Pulsed Avalanche Energy (Note 7)		Eas	13	mJ	

Thermal Characteristics (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 5)	T _A = +25°C	D-	1.2	W
Total Fower Dissipation (Note 5)	$T_A = +70^{\circ}C$	PD	0.8	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	D	104	°C/W
Thermal Resistance, Junction to Ambient (Note 3)	t<10s	R _θ ЈА	51	
Total Dawer Discipation (Note C)	T _A = +25°C	þ	2.2	W
Total Power Dissipation (Note 6)	T _A = +70°C	PD	1.4	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	D	60	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	t<10s	R _θ ЈА	30	
Thermal Resistance, Junction to Case (Note 6)	Rejc	7.6		
Operating and Storage Temperature Range	TJ, TSTG	-55 to +150	°C	

Electrical Characteristics (@TA = +25°C, unless otherwise specified.)

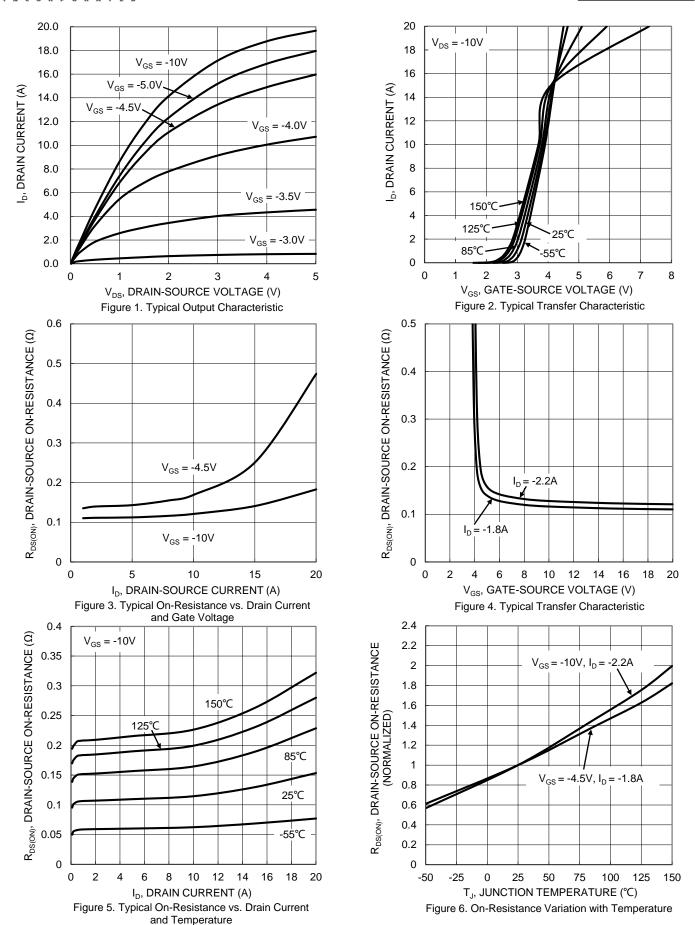
			_				
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)							
Drain-Source Breakdown Voltage	BV _{DSS}	-60	_	_	V	$V_{GS} = 0V, I_{D} = -250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}		_	-1	μΑ	$V_{DS} = -48V, V_{GS} = 0V$	
Gate-Source Leakage	Igss	_	_	±100	nA	$V_{GS} = \pm 20V$, $V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)						•	
Gate Threshold Voltage	V _{GS(TH)}	-1	_	-3	V	V _{DS} = V _{GS} , I _D = -250μA	
Static Drain-Source On-Resistance	Descour		110	150	mΩ	V _{GS} = -10V, I _D = -2.2A	
Static Dialii-Source Off-Resistance	RDS(ON)		130	185	11177	$V_{GS} = -4.5V, I_D = -1.8A$	
Diode Forward Voltage	VsD	_	-0.75	-0.95	V	V _G S = 0V, I _S = -1A	
DYNAMIC CHARACTERISTICS (Note 9)						•	
Input Capacitance	Ciss	_	708	_	pF	V 00V V 0V	
Output Capacitance	Coss		39	_	pF	$V_{DS} = -30V, V_{GS} = 0V,$ - f = 1MHz	
Reverse Transfer Capacitance	C _{rss}		32	_	pF	1 = 1101112	
Gate Resistance	Rg		17	28	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = -4.5V)	Qg		6.2	_	nC		
Total Gate Charge (Vgs = -10V)	Qg		14	_	nC	Vps = -30V. lp = -12A	
Gate-Source Charge	Qgs		2.8	_	nC	VDS = -30V, ID = -12A	
Gate-Drain Charge	Q _{gd}	_	3.1	_	nC		
Turn-On Delay Time	t _D (ON)		5.2	_	ns		
Turn-On Rise Time	tR	_	23	_	ns	$V_{DS} = -30V, R_{L} = 2.5\Omega$	
Turn-Off Delay Time	tD(OFF)	_	33	_	ns	$V_{GS} = -10V$, $R_{G} = 3\Omega$	
Turn-Off Fall Time	tF	_	39	_	ns		
Body Diode Reverse Recovery Time	t _{RR}		22	_	ns	L 424 di/dt 4004/wa	
Body Diode Reverse Recovery Charge	Qrr	_	17	_	nC	$I_F = -12A$, di/dt = 100A/ μ s	

5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout. Notes:

6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1 linch square copper plate.
7. UIS in production with L = 0.1mH, starting T_A = +25°C.
8. Short duration pulse test used to minimize self-heating effect.

^{9.} Guaranteed by design. Not subject to product testing.







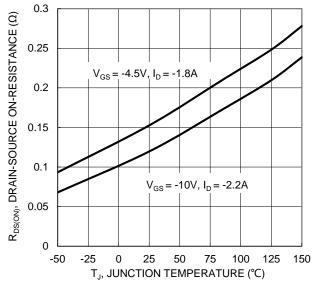
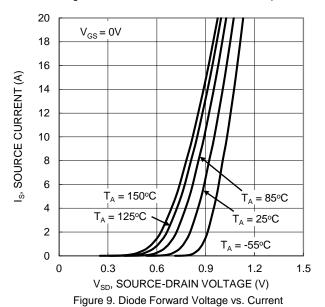


Figure 7. On-Resistance Variation with Temperature



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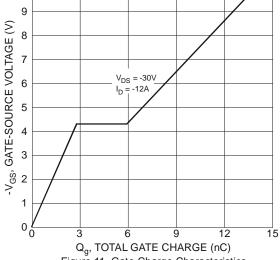


Figure 11 Gate-Charge Characteristics

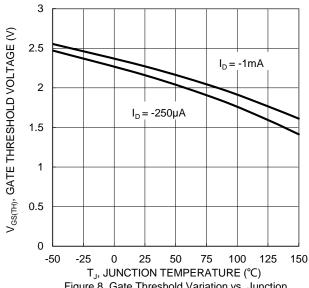
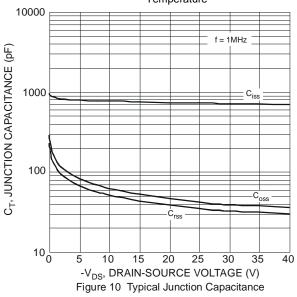
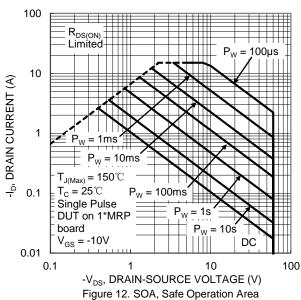
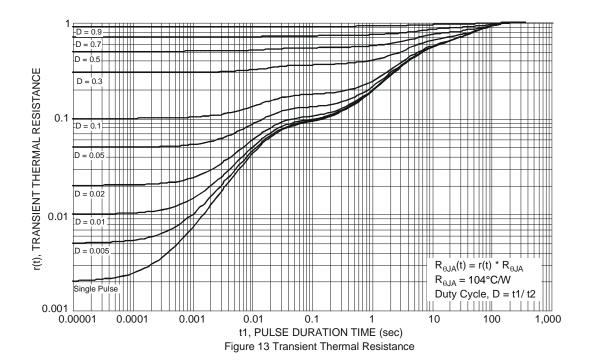


Figure 8. Gate Threshold Variation vs. Junction Temperature







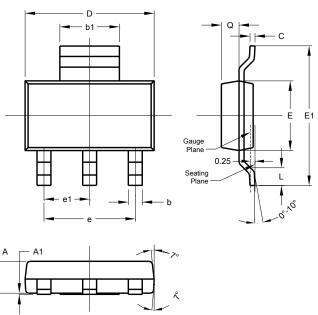




Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT223

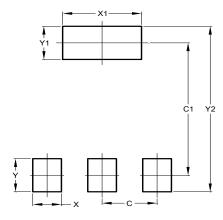


SOT223					
Dim	Min	Max	Тур		
Α	1.55	1.65	1.60		
A1	0.010	0.15	0.05		
b	0.60	0.80	0.70		
b1	2.90	3.10	3.00		
C	0.20	0.30	0.25		
D	6.45	6.55	6.50		
Е	3.45	3.55	3.50		
E1	6.90	7.10	7.00		
е	-	-	4.60		
e1	-	-	2.30		
L	0.85	1.05	0.95		
Ø	0.84	0.94	0.89		
All Dimensions in mm					

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT223



Dimensions	Value (in mm)
С	2.30
C1	6.40
Х	1.20
X1	3.30
Υ	1.60
Y1	1.60
Y2	8.00



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